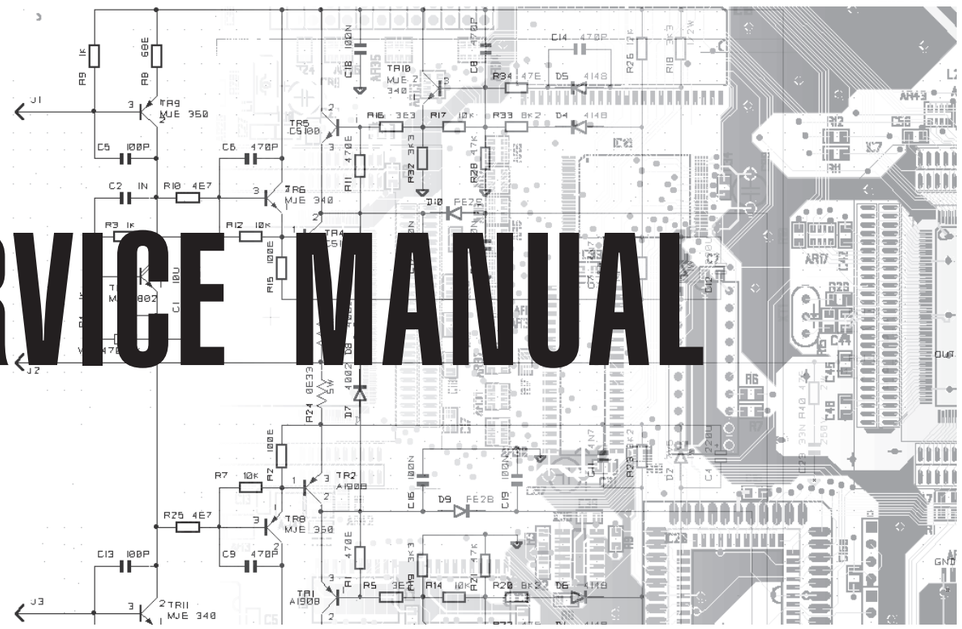
WK2
MIDI ARRANGER

WK2
ORIENTAL
MIDI ARRANGER

SERVICE MANUAL

2nd Edition



GENERALMUSIC®

CODE: 270224

Index

2 Opening Instructions and Layouts
3 Parts Assembly and Controls Panel (Oriental)
4 Block Diagram
5 Power Supply, Power Amplifier, Control Panel, MIDI & I/O Controls, HD Interface Boards
6 CPU & Sound Generator Board (part 1/2)
7 CPU & Sound Generator Board (part 2/2), Timing Table
8 Vocal Processor Board
9 Spare Parts List

Warnings

Notice

Service must be carried out by qualified personnel only.Any tampering carried out by unqualified personnel during the guarantee period will forfeit the right to guarantee.
For a correct operation of the instrument, after having switched off, be careful to wait at least 3 seconds before switching on again.
To improve the device's specifications, the schematic diagrams may be subject to change without prior notice.
All components marked by this symbol have special safety characteristics, when replacing any of these components use only manufacturer's specified parts.
The (μ) micro symbol of capacitance value is substituted by U.
The (Ω) omega symbol of resistance value is substituted by E.
The electrolytic capacitors are 25Vdc rated voltage unless otherwise specified.
All resistors are 1/8Ω unless otherwise specified.
All switches shown in the "OFF" position. All DC voltages measured to ground with a voltmeter 20KOhm/V.

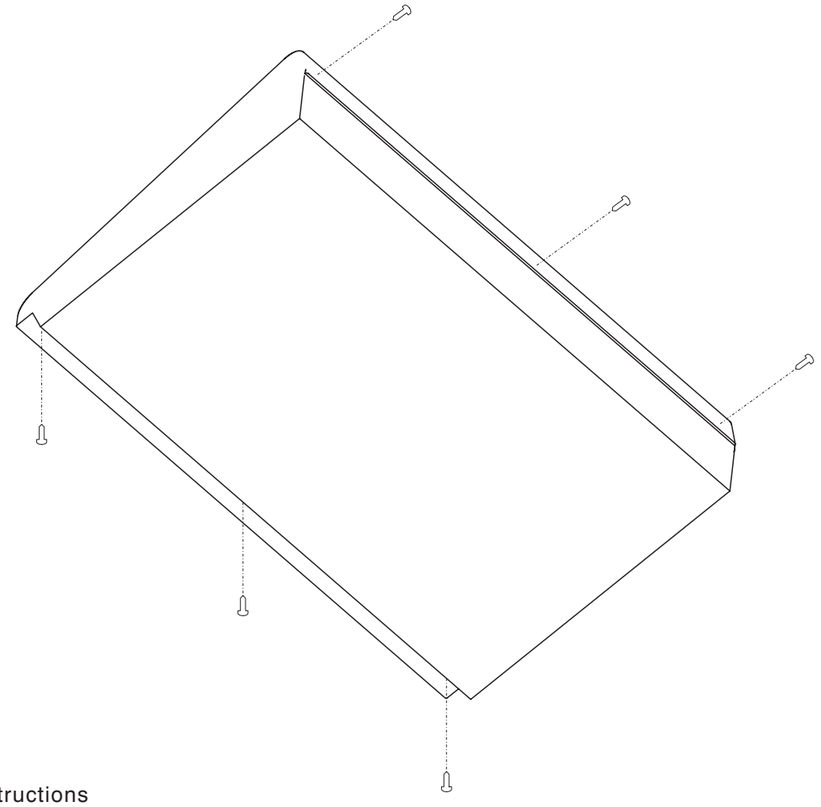
← Soldering point.	↑ Supply voltage.	⏚ Logic supply ground.
⊷ Male connector.	⊡ Test point.	⏚ Analog supply ground.
⊶ Female connector.	⬭ Flag joined with one or more flags	⏚ Chassis ground.
⊷ M/F faston connector.	with the same signal name inscribed.	⏚ Earth ground.

ATTENTION

Observe precautions when handling electrostatic sensitive devices.

Address

GENERALMUSIC S.p.A. Sales Division: 47842 S.Giovanni in Marignano (RN) ITALY - Via delle Rose, 12 - tel. 0541/959511 - fax 0541/957404
GENERALMUSIC on the NET: http://www.generalmusic.com



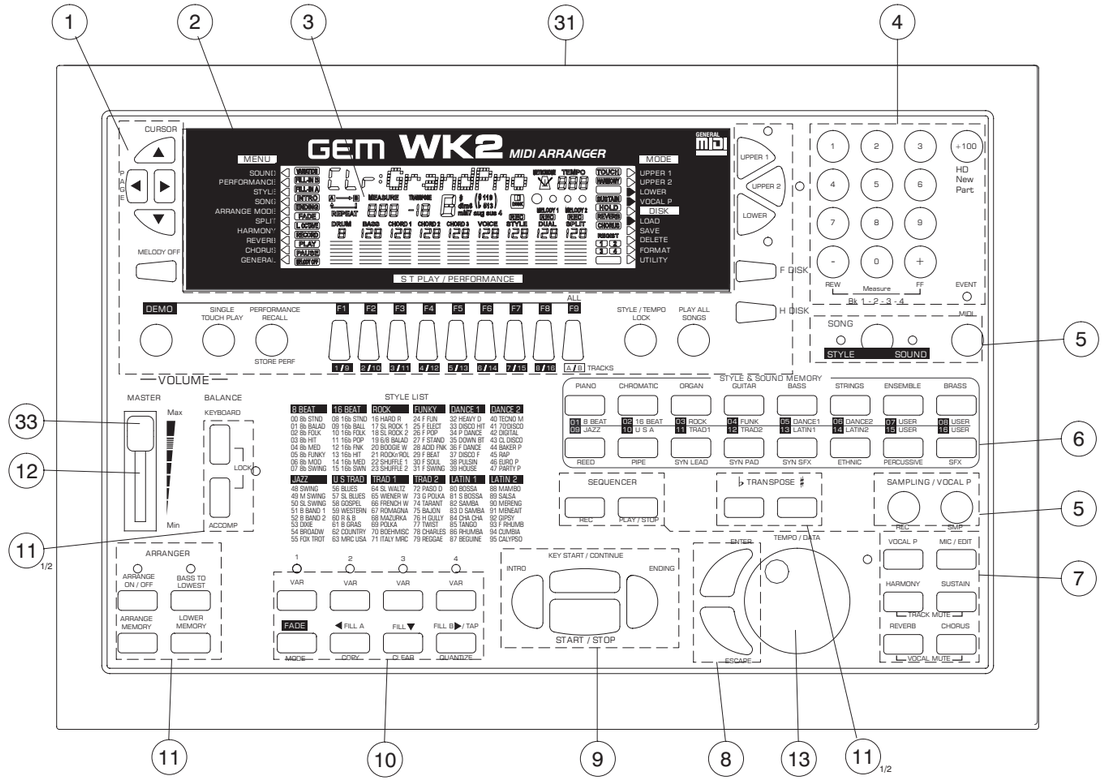
Opening Instructions

Turn the instrument over and unscrew the six screws as shown above, hold the chassis (top and bottom) tightly and turn the instrument the right way up, lift off the top chassis with care without forcing or disconnecting cables.

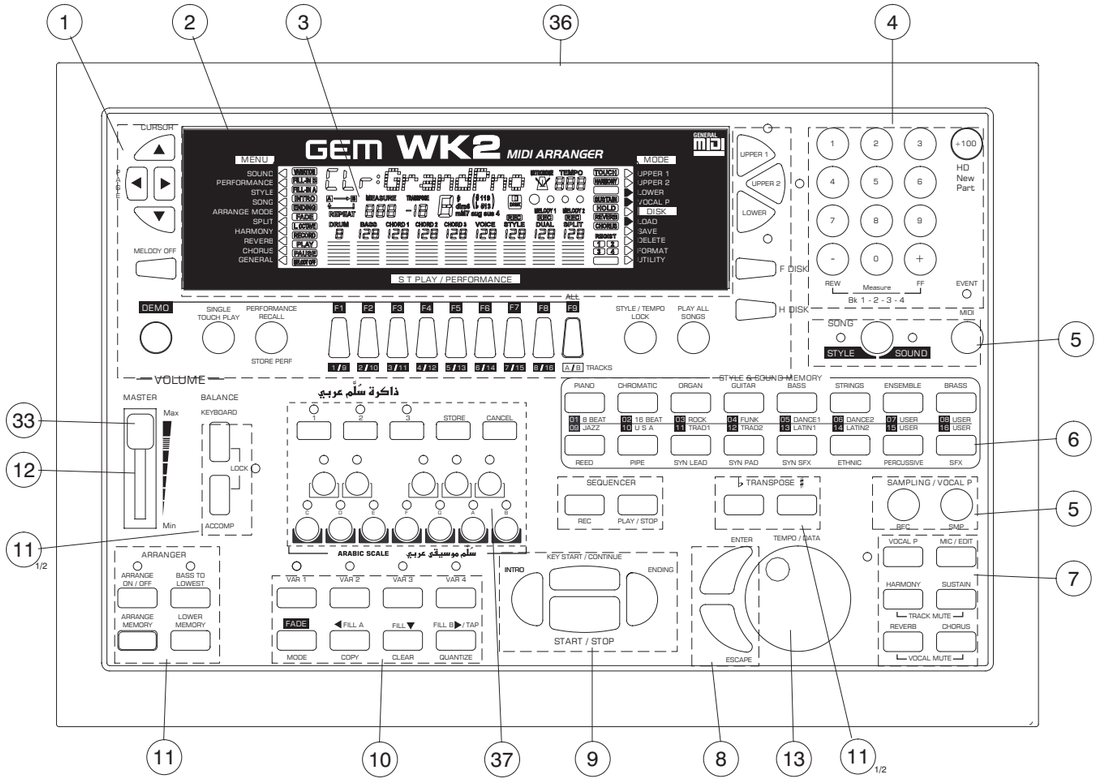
Parts Assembly

For parts descriptions refer to Spare Part List above in this manual.

WK2 Standard and Accordion

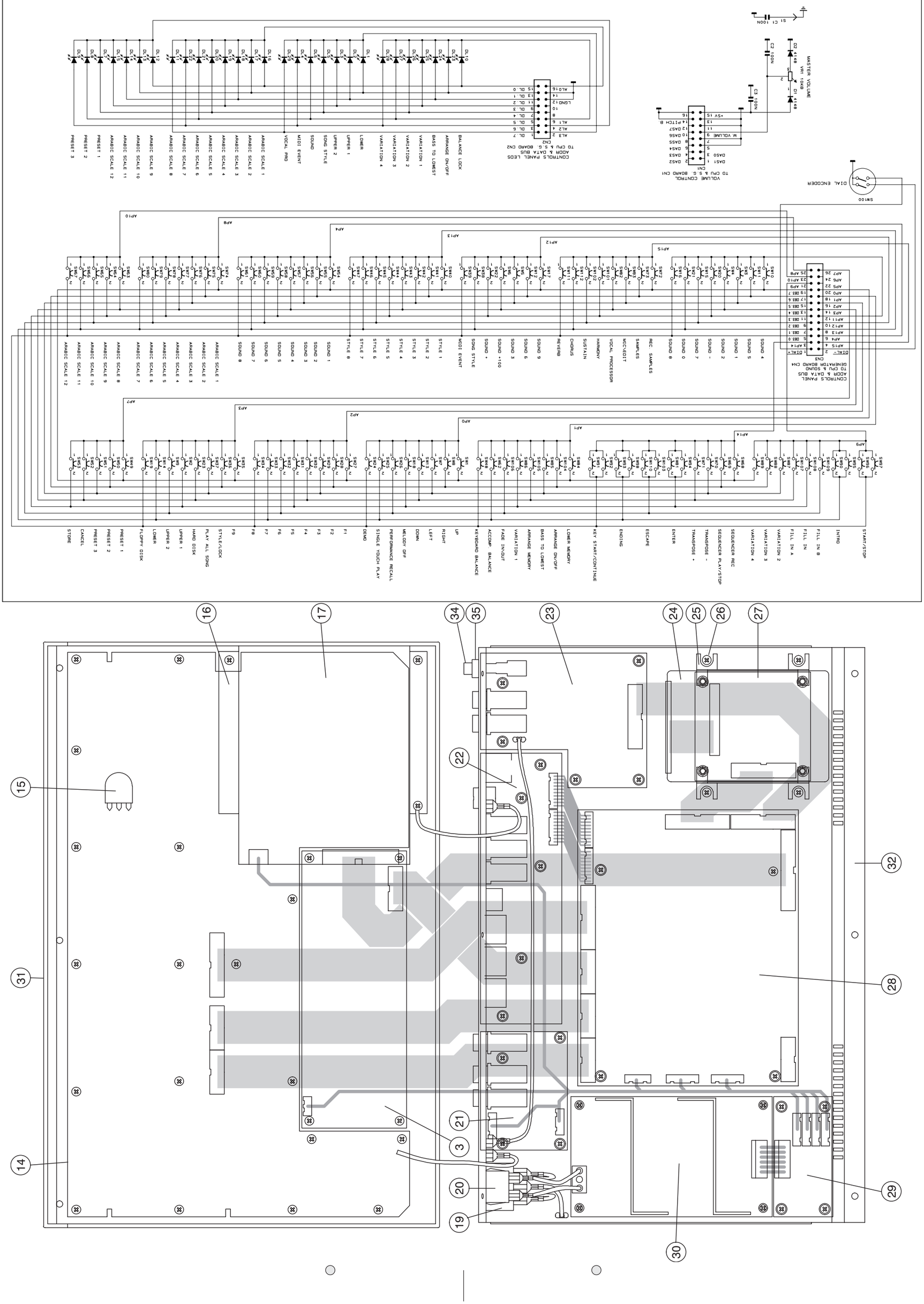


WK2 Oriental



DRW G. BOCCIATO	DWG# 500911	PCB# 31067!	GENERALMUSIC S.p.A.
CKD J. VITALI	DATE 26-07-00	DESCRIPTION MK2 ORIENTAL ARRANGER	CONTROL PANEL BOARD
APP R.MORBIDI	REV# A		

ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC



730987 – MIDI & CONTROLS I/O BOARD

S-VHS | RGB | DAMPER | PEDAL | PEDALS VOLUME | MIDI IN | MIDI OUT | MIDI THRU | SERIAL PORT

CN2 | CN4 | CN3

731012 – PHONES AMPLIFIER & OUTPUTS BOARD

LEFT | RIGHT/M | PHONES

CN2 | CN1

MDL735008 – LCD DISPLAY

810673 – std & Accordion versions
810683 – Oriental Version
CONTROLS PANEL BOARD

CN3 | CN2 | CN1

MAINS

POWER SWITCH ON/OFF

731011 – SNP9541 SWITCHING SUPPLY UNIT

TB1 | TB2 | CN1

731013 – BATTERY/RESET BOARD

RESET (VOK)

CN2, 3, 4, 5

CN8, 10

761164 – standard version
761185 – Accordion Version
761178 – Oriental Version
CPU & SOUND GENERATOR BOARD

CN6 | CN5 | CN7 | CN1 | CN3 | CN2 | CN4

DAC 1BIT

PAL/NTSC OSCILLATOR

QUARTZ 1.8432MHz

PAL/NTSC ENCODER

STANDALONE OSD

VIDEO CONTROLS

RESET

IKE-PLUS CPU & DIGITAL SOUND PROCESSOR

CPU DATA BUS (D0–D15)

BOOT & STYLES ROM | 32MBIT WAVES ROM | 4MBIT FLASH MEMORY | 1Mx16 DYNAMIC RAM

CPU ADDR BUS (A0–A21)

CONTROLS

BUFFER

VOLUME & ARABIAN CONTROLS

DATA BUS (DL0–DL7)

BUFFER

DATA BUS (DL.0–DL.7)

DECODERS

DATA BUS (AP0–AP10)

DATA BUS (DB0–DB7)

BUFFER

DATA BUS (DB3.0–DB3.7)

CLOCK 16MHz

FLOPPY DISK CONTROLLER

(P5,0–P5,7)

CLOCK 30MHz

BUFFER

BUFFER

DATA BUS (DV0–DV7)

CN13 | CN9 | CN11

CN2

730989 – HD INTERFACE B.

CN3 | CN1

J1

3.5" DISK DRIVE

J2

HARD DISK (optional)

CN1

761179 – VOCAL PROCESSOR

DRW Palanghi	DWG# 500859	PCB#	GENERALMUSIC S.p.A. ITALY
CKD Vitri	DISK: PART:1/1	WK2 Arranger BLOCK DIAGRAM	ALL RIGHTS ARE RESERVED, NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. Morbidi	REV:28-07-00		

810673 - CONTROLS PANEL BOARD

VOLUME, MOD., PITCH & ARABIAN SCALE CONTROLS
FROM/TO CPU & SOUND GENERATOR BOARD CN1

CONTROL LEDS ADDR & DATA BUS
FROM/TO CPU & SOUND GENERATOR BOARD CN2

MASTER VOLUME

BALANCE LOCK · ARRANGE ON/OFF · BASS TO LOWEST · VARIATION 1 · VARIATION 2 · VARIATION 3 · VARIATION 4 · LOWER · UPPER 1 · UPPER 2 · SONG STYLE · SOUND · MIDI EVENT · VOCAL PRO

FILL A · FILL · FILL B · START/STOP · INTRO · VARIATION 2 · VARIATION 3 · VARIATION 4 · REC SEQUENCER · PLAY/STOP SEQ. · TRANSPOSE - · TRANSPOSE + · KEY START/CONT. · ENDING · ESCAPE · ENTER · FADE · VARIATION 1 · ARRANGE ON/OFF · ARRANGE MEMORY · LOWER MEMORY · BASS TO LOWEST · KEYBOARD BALANCE · ACCOMP BALANCE · DEMO · UP · DOWN · SINGLE TOUCH PLAY · MELODY OFF · LEFT · RIGHT · PERFORMANCE RECALL · F1 · F2 · F3 · F4 · F5 · F6 · F7 · F8 · F9 · STYLE/TEMPO LOCK · PLAY ALL SONG · FLOPPY DISK · LOWER · UPPER 2 · UPPER 1 · HARD DISK

SOUND - · SOUND 0 · SOUND 7 · SOUND 8 · SOUND 4 · SOUND 5 · SOUND 2 · SOUND 1 · REC SAMPLES · SAMPLES · REVERB · CHORUS · HARMONY · VOCAL · MIC/EDIT · SUSTAIN · SOUND 6 · SOUND 9 · SOUND + · SOUND +100 · SOUND 3 · SONG/STYLE+SOUND · MIDI EVENT · STYLE 01 · STYLE 02 · STYLE 03 · STYLE 04 · STYLE 05 · STYLE 06 · STYLE 07 · STYLE 08 · STYLE 09 · STYLE 10 · STYLE 11 · STYLE 12 · STYLE 13 · STYLE 14 · STYLE 15 · STYLE 16

SW82 DIAL ENCODER

FROM/TO CPU & SOUND GENERATOR BOARD CN4
CONTROLS PANEL ADDR & DATA BUS

PCB#310636

730987 - MIDI & CONTROLS I/O BOARD

UNUSED GATES
IC2 74HC04
IC3 MAX202E

MIDI IN · MIDI THRU · MIDI OUT · SERIAL PORT

RS232 RS422

MIDI & CONTROLS FROM CPU & S.G. BOARD CN3

PEDAL VOLUME · PEDAL · DAMPER

VIDEO FROM CPU & S.G. BOARD CN6

PCB#310628/1

731012 - PHONES AMPLIFIER AND OUTPUTS BOARD

OUTPUTS FROM CABLE ASSY CN1
FROM CPU B. CN7 pin 1 · FROM CPU B. CN7 pin 4 · FROM CPU B. CN7 pin 3 · FROM CPU B. CN7 pin 2

ANALOG SUPPLY FROM CABLE ASSY CN2
FROM BATTERY B. CN2 pin 2 · FROM BATTERY B. CN4 pin 6 · FROM BATTERY B. CN5 pin 5 · FROM CPU B. CN8 pin 3

RIGHT/M · LEFT OUTPUTS · PHONES

PCB#310640

731011 SNP9541 40W SWITCHING SUPPLY UNIT

MAINS (EU)(US) 115-230Vac +/-15% 50/60Hz · MAINS SOCKET · MAINS SWITCH

731013 - BATTERY/ RESET BOARD

TO CPU B. CN8 PIN 2 · TO AMP & OUT B. CN1 PIN 1 · TO CPU B. CN8 PIN 5 · TO CPU B. CN10 PIN 5 · TO CPU B. CN10 PIN 4 · TO CPU B. CN10 PIN 6 · TO FLOPPY DISK CN1 PIN 1 · TO DISPLAY BOARD PIN 1 · TO CPU B. CN10 PIN 2 · TO CPU B. CN10 PIN 3 · TO CPU B. CN10 PIN 1 · TO CPU B. CN8 PIN 6 · TO CPU B. (SUPPLY) IC10 PIN 1 · TO CPU B. CN8 PIN 1 · TO AMP & OUT B. CN2 PIN 3 · TO CPU B. CN8 PIN 4 · TO DISPLAY BOARD PIN 2 · TO FLOPPY DISK CN1 PIN 3 · TO FLOPPY DISK CN1 PIN 2 · TO AMP & OUT B. CN2 PIN 2

PCB#310641

730989 - HD INTERFACE BOARD

HD INTERFACE DATA I/O FROM CPU & S.G. BOARD CN9

TO IDE/EDDE HD TYPE HARD DISK

UNUSED

PCB#310592

DRW VITRI	DWG# S00862	PCB# 310629-310628/1-310615-310592	GENERALMUSIC S.p.A.
DEPT. KEYBOARDS	DATE 22-01/99	DESCRIPTION WK2 MIDI ARRANGER PWR AMP & OUTPUT, HD INTERFACE, CONTROLS PANEL, BATTERY/RESET AND MIDI BOARDS	ALL RIGHTS ARE RESERVED. NO COPIES OR REPRODUCS THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
PART# 1 OF 1	REV#		

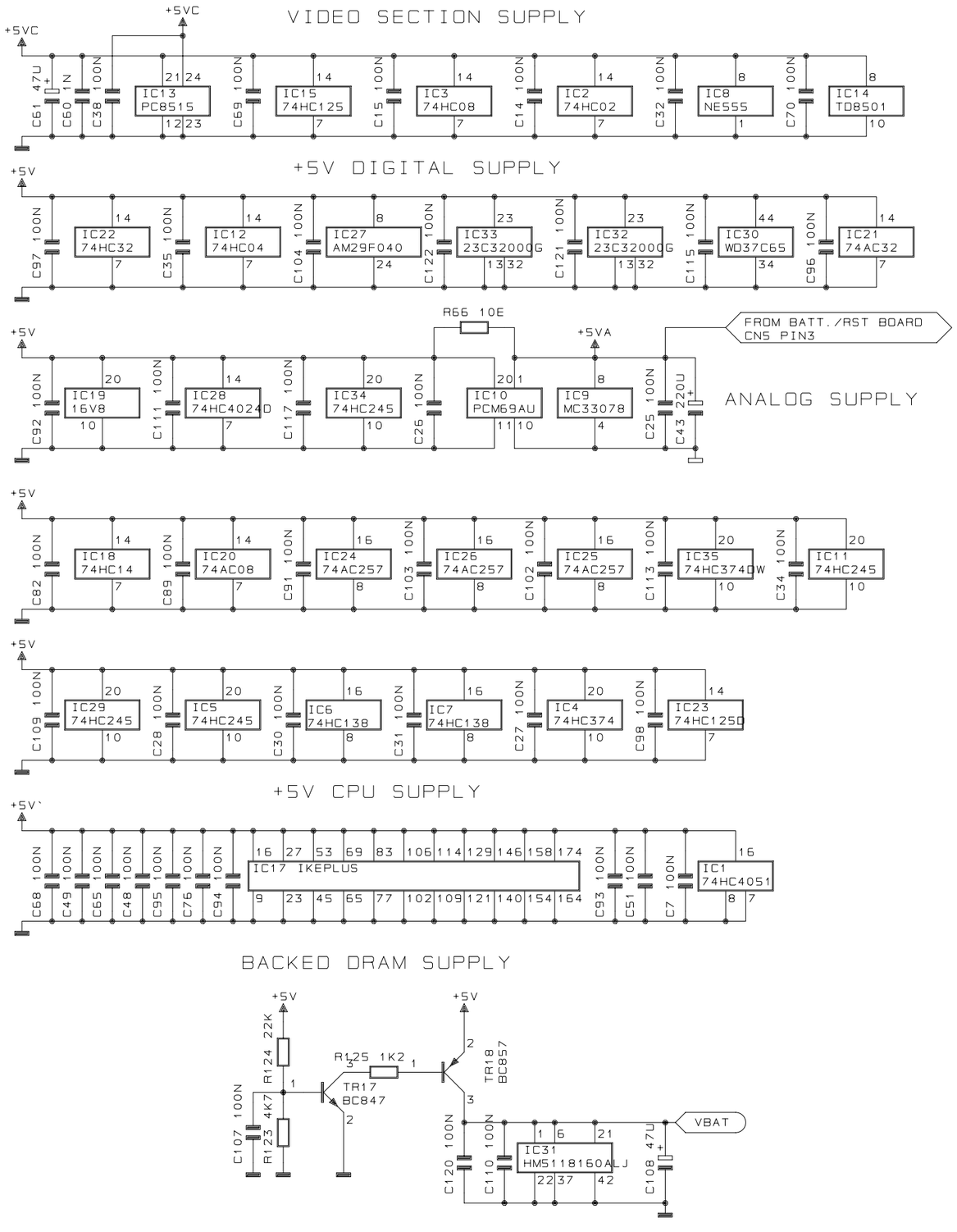
761164 (STANDARD VERSION)
761185 (ACCORDION VERSION)
761178 (ARABIAN VERSION)
CPU & SOUND GENERATOR BOARD
(PART 1/2)

NOTE
THE ROM MOUNTED IN IC33 POSITION DEPEND BY THE MODELS:
104038 16Mbit BOOT & STYLES ROM (STANDARD VERSION)
761186 ACCORDION BOOT & STYLES ROM MODULE (ACCORDION VERSION)
104043 32Mbit BOOT & STYLES ROM (ORIENTAL VERSION)

DRW BOCCATO	DWG# S00860	PCB# 310615/1	GENERALMUSIC S.p.A.
CKD VITRI	DATE 26-07-00	DESCRIPTION WK2/ACCORDION/ORIENTAL CPU & SOUND GENERATOR BOARD	ALL RIGHTS ARE RESERVED, NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
APP MORBIDI	REV# B		

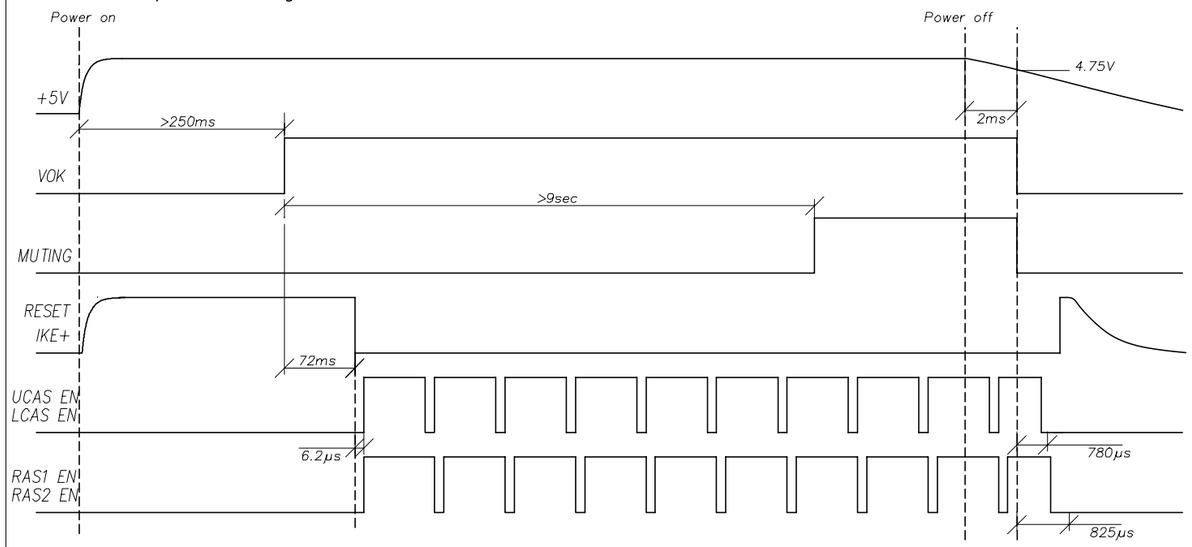
SUPPLIES: PART 2/2: S00860B S00860A

CPU & SOUND GENERATOR BOARD (PART 2 OF 2)



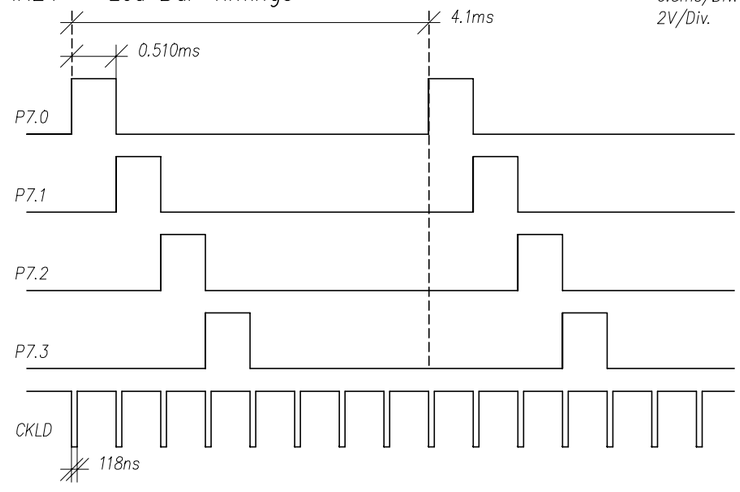
DRW VITRI	DWG# 500860B	PCB# 310615/1	GENERALMUSIC S.p.A.
DEPT. KEYBOARDS	DATE 18/06/98	DESCRIPTION WK2 - WK2 oriental CPU & SOUND GENERATOR BOARD	ALL RIGHTS ARE RESERVED, NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
PART# 2 OF 2	REV# B		

POWER ON/OFF Timings



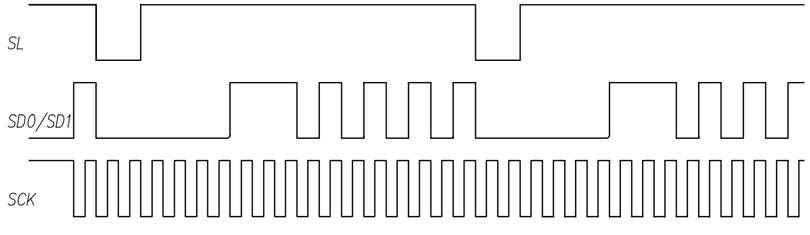
IKE+ – Led Bar Timings

0.5ms/Div.
2V/Div.



IKE+ – DA Converter (PCM69AU) Timings

5us/Div.
2V/Div.



DRW G. Boccato	DWG# 500858	PCB#	GENERALMUSIC S.p.A. ITALY
CKD J. Vitri	DISK: PRT:1/1	Timings Table	ALL RIGHTS ARE RESERVED, NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC.
APP. R. Fraternali	REV: 16-04-99		

761179 - VOCAL PROCESSOR BOARD

VOCAL PROCESSOR
TO CPU & S.G. BOARD CN11

CN1

IC1 MC33078

IC3 ADSP2181

IC5 AD1877 SIGMA DELTA A/D CONVERTER

IC7 74HC374 OCTAL D-TYPE FLIP FLOP

IC10 74AC138 3 OF 8 DECODER

MIC IN +10/+40 dB

LINE IN -6/+15 dB

DRW VITRI I.	DWG# 500861	PCB# 310644	GENERALMUSIC S.p.A.
DEPT. KEYBOARDS	DATE 23-12-98	DESCRIPTION WK2 MIDI ARRANGER	ALL RIGHTS ARE RESERVED, NO COPIES OR REPRODUCE THIS DOCUMENT WITHOUT WRITTEN CONSENT BY GENERALMUSIC
PART# 1 OF 1	REV# A	VOCAL PROCESSOR BOARD	

AUTOTEST PROCEDURE

This procedure are not intended to repair a fault but only to check the proper instrument operations after a repairing execution. The procedures that follow must be executed in the order specified.

Instrument and Tools

1) Dual trace oscilloscope.
2) Two amplified speakers or headphones.
3) Midi keyboard.
4) Midi cable.
5) Television with RGB and S-VHS input sockets compatible with PAL and NTSC standards.
6) S-VHS cable.
7) DIN/SCART cable.
8) DIN/RCA cable.
9) Switch pedal (Normally Closed contacts).
10) Volume pedal.
11) Latest version of the appropriate Operating System Disk.
12) Dynamic microphone.

Setup

- Connect the television by RGB and S-VHS sockets.
- Connect the dynamic microphone to the Vocal Processor MIC socket if present.
- Connect the speakers or the headphone to the appropriate outputs.
- Connect the Midi keyboard (set it properly) to the MIDI IN socket.

Operating System Check

- Turn on the instrument.
- The instrument starts with the video output set on PAL mode by default. Set TV input on RGB mode, on the TV screen must appear the welcome message.
- Place the cursor on "GENERAL" pressing the cursor DOWN button, press cursor RIGHT button until the operating system release date is displayed, verify that this date correspond to the latest release date.
- If an update is required put the Operating System disk into the disk drive and turn on again the keyboard, the display shows "LOAD O.S." then press ENTER to confirm.
- NOTE: After any servicing operation a Operating System re-loading is recommended.

Autotest Procedure

- Press UPPER 1 and PIANO, CHROMATIC, ORGAN keys simultaneously to reset the instrument, the display shows "SysRESET" and during the time of "Wait..." message appears press F1 repeatedly and quickly: the instrument re-starts in autotest mode and "AutoTEST" and "TEST (F1)" messages appear.

Ram

- Press F1 key to start the RAM test, the display shows "RAM TEST" during the procedure and shows "OK! (F1)" when terminate successful.

Controls Panel

- Press again F1 to start the LEDs test. Each LED lights up sequentially.
- Press F1 to start the button test, press all the buttons except F1, every time you press a button the display shows the corresponding identification code and you hear a note.
- Finally Press F1 and instrument re-start again.

Dial Encoder

- Check the DIAL operation on the display: the "TEMPO" increase when you rotate the DIAL clockwise and decrease when you rotate it counter-clockwise.

Midi In/Out

- Play something on the keyboard attached, the led EVENT flash at each key note action and the instrument plays the sound selected by UPPER 1 section.
- Connect a second WK2 or other General Midi device (expander or keyboard) to the MIDI OUT socket.
- Press START/STOP and the device attached must play the accompaniment from the WK2 Midi arranger.
- Press START/STOP again to stop it, and disconnect the second instrument.

Right & Left Outputs

Check the level from the output sockets as follow:

- Select MIDI/GENERAL with UP and DOWN cursor keys at the left of the display.
- Press cursor RIGHT button until the display shows "80 :KEY TCH"
- Rotate clockwise the DIAL wheel until the display shows "OFF : KEY TCH"
- Select 68 with SOUND keypad, the display shows "68 :OBOE".
- Disable REVERB and CHORUS by pressing their correspondent buttons.
- Set MASTER VOLUME potentiometer to its maximum.
- Play C5 on the keyboard attached and verify with the oscilloscope the output levels: their must be 0,65Vpp on R & L sockets and 1,45Vpp on HEADPHONE sockets.

Pedals

- Plug in the PEDAL VOLUME to its socket, it vary the level from 0 (no sound) to the level set by MASTER VOLUME potentiometer.
- Plug in the switch pedal to the DAMPER socket, press down the pedal and then press a note key with the keyboard attached: the instrument plays the note, release the note key and the sound holds on, release the pedal switch and the sound shuts off.
- Plug in the switch pedal to the PEDAL socket, the pedal action switches from "Upper 1" and "Upper 2" also lights up the corresponding LED.

Computer Socket

Set the keyboard on COMPUTER MODE pressing the following buttons:

- Select GENERAL with UP and DOWN cursor keys at the left of the display.
- Press cursor RIGHT until display shows "OFF: SERIAL".
- Rotate the DIAL wheel until display shows "MAC: SERIAL"
- Connect the CH1 probe of the oscilloscope at PIN 1 of the COMPUTER socket and its ground clip at PIN 4, set it at 200uS/div. 2V/div.: the trace must show a 1MHz signal with 5V of amplitude centred on 0V (±2.5V).
- Connect the CH2 probe of the oscilloscope at PIN 6 of the COMPUTER socket and its ground clip at PIN 4, set it at 500uS/div. 10V/div.: playing some notes on the keyboard, the CH2 oscilloscope trace must shows a sequence of pulses with 24V of amplitude centred on 0V.
- Rotating the DIAL wheel select "PC1" or "PC2" you configure keyboard to work with a PC.
- Playing some notes on the keyboard you must see the same previous pulses onto the oscilloscope.

Outputs Video

- **NTSC mode, RGB Selection**
  Select NTSC mode on the instrument as follow :
- Select GENERAL with up and down cursor keys at the left of the display.
- Press RIGHT cursor until display shows "TV=PAL"
- Rotate the DIAL wheel until select "TV=NTSC" On TV must appear the following message:

GEM WK2
Midi Arranger

wrote larger than in the previous PAL setting.

- Disconnect or deselect the RGB input and select the S-VHS input (YC3) on TV.
- **NTSC mode, S-VHS Selection**
  Now you can regulate the colours and the flicker on TV rotating the C17 capacitor trimmer.
- **PAL mode, S-VHS Selection**
  Select PAL mode rotating the DIAL wheel until display shows "TV=PAL".
- Now you can regulate the colours and flickers on TV rotating the C18 capacitor trimmer.
- Press ESCAPE button.
- Reconnect or reselect the RGB input to the TV.

Hard Disk (if present)

Verify Hard Disk "Direct load" operation as follow :

- Press HARD DISK key, display shows the first partition name.
- Press ENTER and will appear the name of the song.
- Press START/STOP and the song will start to play in "Direct" mode (reading data direct from HD), hear the song for few seconds ad press START/STOP key again.

Vocal Processor (if present)

- Press VOCAL P and an arrow will appear on the display.
- Press MIC/EDIT button, display shows "MIC OFF" .
- Press "+" button in the SOUND area to activate the microphone (display message change in "MIC ON") and speak some words into the microphone.
- Rotating the DIAL wheel verify microphone volume changes.

Ram Back Up Check

- Press TRANSPOSE "#" and display shows below TRANSPOSE "1".
- Switch off the instrument and wait at least 20 sec. When you switch on the instrument be sure display shows the same "TRANSPOSE" number.

Reliability & Final Check

- Before reassembling the instrument and before deliver it to the user, it is a goal verify its reliability:
- To do that switch it off, or leaving it switched on but operating with greatest caution, carefully shake the boards and connections inside it using an insulated tool (for example the handle of the screwdriver) to find wrong contacts and so on.
- Turn on the instrument and re-check that it operate correctly, leaving it switched on for a long time and occasionnally launching the Demo sequence (press DEMO and a Fnumber button) or verifing its functionality.

Reset Procedure

- Turn on while press down UPPER1, PIANO, CHROMATIC, ORGAN.

Spare Part List

Legend	
EU	= European Version
US	= United States Version
Oriental	= Oriental Version
Accordion	= Accordion Version

Ref	Code		Description

Accessories

	955917		Operating System Disk
	955945		Operating System Disk (Oriental)
	955925		Operating System Disk (Accordion)
	955910		Demo Disk
	955915		Demo Disk (Oriental)
	651926		Sound List Sheet
	653478		Sound List Sheet (Oriental)
	271245		Owner's Manual
	271305		Owner's Manual (Oriental)
	271242		International HD Contents Manual
	271239		Italian HD Contents Manual
	130430		1Mt Length Midi Cable
	130317		DIN/SCART Video Cable (Pal)(EU)
	130428		DIN/RCA Video Cable (Ntsc)(US)
	130297		Mains Cord (EU)
	130283		Mains Cord (US)

Optional Accessories

	970310	Multimedia Kit
	970116	Single Footswitch
	970080	Triple Foolswitch
	970013	Volume Pedal
	970107	Professional Volume Pedal

Assembly

3	**MDL735008**		**Lcd Display**
13	MDL345018		Dial Knob
	660607		Spacer for Rear Sockets
32	660604		Bottom Chassis
2	653439		Display Glass
31	653438		Chassis Cover (Oriental)
	651925		25x90mm Black Cloth
24	**561008**		**Hard Disk with International Contents**
24	**561007**		**Hard Disk with Italian Contents**
	340931		9.5mm Plug For Unused Hole
26	340905		Suspension Rubber
33	340834		Slider Potentiometer Knob
35	340503		Lower Potentiometer Knob
34	340502		Upper Potentiometer Knob
	210256		Anti-Dust Felt for Potentiometers
	190233		Insulator for HD
	190232		Insulator for Switching Supply Unit
	190015		Adhesive Rubber Foot
	180774		"HARD DISK" Adhesive Plate
25	171639		HD and HD Interface Board Support
16	170958		FD Drive Support
	150474		11.1mm Plug For Unused Hole
	120960		Dial Steel Sphere
	120581		M3 Nut
	120521		3mm Grower Washer
	120410		3x6tc Blck Screw
	120322		WL4x15tc Black Screw
	120281		WL3x15tt Black Screw
	120256		B2.9x9.5tsp Black Screw
	120029		M3x6tc Black Screw
	120025		M3x10tsp Black Screw
19	110614		Mains Socket
17	110400		3.5" FDisk Drive
20	110285		4A 250Vac Bipolar Power Switch
15	110254		Dial Encoder with Snap

Switching Unit

30	**731011**		**SNP9541M 40W Switching Supply Unit**

Battery/Reset Board

29	**731013**		**Battery/Reset Board (Pcb#310641)**
	141102	*	6 Contacts Vert Male Connector
	110300	*	4.8V 280mAh Nicd Battery
	100748	*	MAX709 Power Supply Monitor Voltage
	100059	*	7805 +5V 1A Voltage Regulator
	080103	*	1N4148 100mA 75V Signal Diode

Controls Panel Assembly

14	**810673**		**Controls Panel Board (Pcb#310636)**
14	**810683**		**Controls Panel Board (Pcb#310671)(Oriental)**
1	653436	*	<Display> Rubber Key Pad
4	653435	*	<Numbers> Rubber Key Pad
7	653434	*	<Sequencer>+<Vocal P...Chorus> Rubber Key Pad
37	340956	*	<Arabic Scale> Rubber Key Pad
5	340899	*	Red and Gray Dual Rubber Key Pad
11	340897	*	Dual Rubber Key Pad (2x)
6	340896	*	<Style & Sound> Rubber Key Pad
10	340895	*	<Var 1... Fill B/Tap> Rubber Key Pad
8	340890	*	<Enter/Escape> Rubber Key Pad
9	340889	*	<Star/Stop> Rubber Key Pad
	340091	*	4mm Led Spacer
	140882	*	26 Contacts Vert Male Connector
	140854	*	16 Contacts Vert Male Connector
	080752	*	Led 3mm Wide Diffused Red
	080103	*	1N4148 100mA 75V Signal Diode
12	070612	*	10K 30mm Slider Potentiometer

Phones Amplifier & Outputs Board

21	**731012**		**Phones Amplifier & Outputs Board (Pcb#310640)**
	230569	*	FL5R200PNT EMI Coil For Signal
	230527	*	BL02RN2-R62 EMI Coil For Signal
	140217	*	Jack Slim Horizontal S-F Socket
	110305	*	Relay 12V / 2 Switch 1A 250V
	100962	*	TDA 8542 2x1W btl Audio Amplifier
	100919	*	MC33078 Dual LN Operational Amplifier
	090856	*	J176 TO92 P-Channel J-Fet Transistor
	090183	*	BC550 TO92 LN Npn Transistor
	080156	*	1N4002 1A 100V Rectifier Diode

HD Interface Board

27	**731010**		**HD Interface Board (Pcb#310592)**
	841190	*	26 Wires 10cm Length Flat Cable
	140915	*	44 Contacts Vert Male Strip P=2mm
	103031	*	74HC00D SOIC Quad 2-In Nand Gate
	103010	*	74HC04D SOIC Hex Inverter
	103007	*	74HC74D SOIC Dual Flip-Flop
	101507	*	74AC646 SOIC Octal Transceiver Register
	055101	*	4K7 X4 1/16w 5% Smd Resistor Array
	055100	*	100E X4 1/16w 5% Smd Resistor Array
	030715	*	1000u 6v3 20% Vert Electrolytic Capacitor

Midi & Controls I/O Board

22	**730987**		**Midi & Controls I/O Board (Pcb#310628)**
	230569	*	FL5R200PNT EMI Coil For Signal
	140248	*	4 Poles Mini Din Female Socket
	140247	*	8 Poles Mini Din Female Socket
	140219	*	13 Poles Din Horizontal Female Socket
	140217	*	Jack Slim Horizontal S-F Socket
	140212	*	5 Poles Din Horizontal Female Socket
	100734	*	MAX202E RS232 Drivers/Receiver
	100602	*	74HC04 Hex Inverter
	100035	*	6N138 Optocoupler
	080242	*	6V2 1W 5% Zener Diode
	080103	*	1N4148 100mA 75V Signal Diode

Cpu & Sound Generator Board

28	**761164**		**Cpu & Sound Generator Board (Pcb#310615)**
28	**761178**		**CPU & Sound Generator Board (Pcb#310615)(Oriental)**
28	**761185**		**Cpu & Sound Gen. Board (Pcb#310615) (Accordion)**
	761186	*	Accordion Boot-Styles Rom Module (Accordion)
	104038	**	16MBit Boot & Styles Rom
	550659	**	16Mbit Accordion Waves OTP Rom
	560018	*	16V8 GAL programmed
	340934	*	Insulation Washer for Quartz
	230582	*	LC Delay Line 400ns 0.5MHz
	140882	*	26 Contacts Vert Male Connector
	140866	*	34 Contacts Vert Male Connector
	140854	*	16 Contacts Vert Male Connector
	106002	*	NE555 Timer
	106001	*	MC33078P SOIC Dual Low Noise Op. Amp.
	106000	*	TDA8501 PAL/NTSC Encoder
	105011	*	IKE plus - Cpu & Dsp
	104043	*	GM23C32250 32Mbit Rom WK2 "Boot/Styles" (Oriental)
	104038	*	MX23C1610MC-12 16Mbit Rom WK2 "Boot/Styles"
	104032	*	MX23C3210MC-12 32Mbit Rom "GM-GMX Sounds"
	104026	*	AM29F040-75EC 4Mbit Flash Memory Ta=70nS
	104009	*	HM5118160ALJ 16Mbit Dram Ta=70nS
	103030	*	74HC32D SOIC Quad 2-In Or Gate
	103029	*	74HC4024D SOIC 7-Stage Binary Counter
	103019	*	PCA8515 SOIC Standalone OSD
	103017	*	74HC4051DW SOIC 8ch Analog Multiplexer
	103013	*	74HC138D SOIC 1 Of 8 Decoder
	103012	*	74HC125D SOIC Quad Tri-State Buffer
	103010	*	74HC04D SOIC Hex Inverter
	103009	*	74HC02D SOIC Quad 2-In Nor Gate
	103008	*	PCM69AU SOIC 2ch 1bit Dac
	103003	*	74HC374DW SOIC Octal D-Type Flip-Flop
	103002	*	74HC245DW SOIC Octal Bus Transceiver
	103001	*	74HC08D SOIC Quad 2-Input And Gate
	103000	*	74HC14D Soic Hex Inverter Schmitt Trigger
	101508	*	74AC32 SOIC Quad 2-input Or Gate
	101505	*	74AC08 QUAD 2-INPUT AND GATE
	101504	*	74AC257 QUAD-2CH
	100591	*	GM82C765B Floppy Disk Controller
	091002	*	PMBT2369 TO236 Smd Npn Transistor
	091001	*	BC857 TO236 Smd Pnp Transistor
	091000	*	BC847 TO236 Smd Npn Transistor
	081000	*	PMLL4148 Smd 100mA 75V Signal Diode
	055104	*	2K2 X4 1/16w 5% Smd Resistor Array
	055102	*	33E X4 1/16w 5% Smd Resistor Array
	055101	*	4K7 X4 1/16w 5% Smd Resistor Array
	055100	*	100E X4 1/16w 5% Smd Resistor Array
	011502	*	470pF x4 10% 100V NP0 Smd Capacitor Array
	011501	*	220pF x4 10% 100V NP0 Smd Capacitor Array
	011500	*	47pF x4 10% 100V NP0 Smd Capacitor Array
	010730	*	4.433619MHz Quartz Resonator
	010729	*	3.579545MHz Quartz Resonator
	010721	*	1.8432MHz Quartz Resonator
	010714	*	30MHz Quartz Resonator
	010704	*	16MHz Quartz Resonator
	010602	*	5p2-30pF N750 Ceramic Capacitor Trimmer

Vocal Processor Board

23	**761179**		**Vocal Processor Board (Pcb#310644)**
	230569	*	FL5R200PNT EMI Coil For Signal
	230561	*	47uH 10% 100mA RF-Coil
	140882	*	26 Contacts Vert Male Connector
	140217	*	Jack Slim Horizontal S-F Socket
	106001	*	MC33078P SOIC Dual Low Noise Op. Amp.
	105010	*	ADSP2181 Dsp Microcomputer
	103041	*	74HC86 SOIC Quad 2-Input Ex-Or Gate
	103012	*	74HC125D SOIC Quad Tri-State Buffer
	103011	*	AD1877 SOIC Dual Channel 1bit ADC
	103010	*	74HC04D SOIC Hex Inverter
	103007	*	74HC74D SOIC Dual Flip-Flop
	103003	*	74HC374DW SOIC Octal D-Type Flip-Flop
	103001	*	74HC08D SOIC Quad 2-Input And Gate
	101500	*	74AC138D SOIC 1 Of 8 Decoder
	100059	*	7805 +5V 1A Voltage Regulator
	081000	*	PMLL4148 Smd 100mA 75V Signal Diode
	071011	*	2x10K Alog Rotary Pot
	055102	*	33E X4 1/16w 5% Smd Resistor Array
	055101	*	4K7 X4 1/16w 5% Smd Resistor Array
	055100	*	100E X4 1/16w 5% Smd Resistor Array
	031007	*	10u 16V 20% Smd Electrolytic Tantalium Capacitor
	030715	*	1000u 6v3 20% Vert Electrolytic Capacitor
	011500	*	47pF x4 10% 100V NP0 Smd Capacitor Array
	010724	*	16MHz Ceramic Resonator With Capacitors

Wiring Connections

841196	Ground Cable 12cm Length
841194	10 Wires 7.5cm Length Crimp Terminal Cable
841193	Single Mains Cable 7.5cm Length (from socket to switch)
841192	Mains Cables 7.5cm Length (from switch to supply unit)
841191	6 Wires 5cm Length Crimp Terminal Cable
841170	26 Wires 17.5cm Length Flat Cable
841165	44 Wires 5cm Length Flat Cable
841005	Ground Cable 7.5cm Length
840834	Ground Cable 30cm Length
840764	Ground Cable 10cm Length
840655	26 Wires 20cm Length Flat Cable
840612	34 Wires 25cm Length Flat Cable
840529	16 Wires 20cm Length Flat Cable
770849	Cables Assembly

Note:

Each spare part is single quantity unless otherwise specified.	
Asterisk prefix explanation:	
Omitted	= First level spare part.
One asterisk	= Second level, part of previous listed first level part.
Two asterisk	= Third level, part of previous listed second level part.
Three asterisk	= .....

Any request for not above mentioned part must encompass specific description including:

1) Model name,
2) Section name,
3) Module code,
4) Reference name,
5) Quantity number.